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Miyagawa et al.

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[54] OPTICAL RECORDING/REPRODUCING APPARATUS FOR OPTICAL DISKS WITH VARIOUS DISK SUBSTRATE THICKNESSES

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[52] U.S. Cl. 369/44.12; 369/112; 369/44.23; 369/58

[58] Field of Search 369/44.11, 44.12, 109, 369/112, 118, 44.23, 44.24, 94, 93, 95, 58, 44.37; 250/201.5, 227.11

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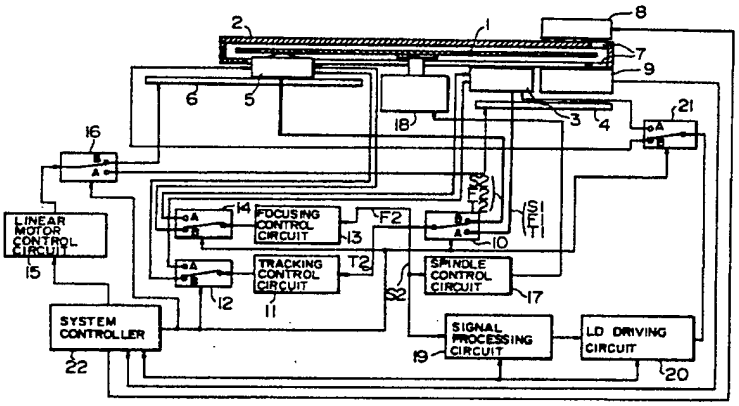
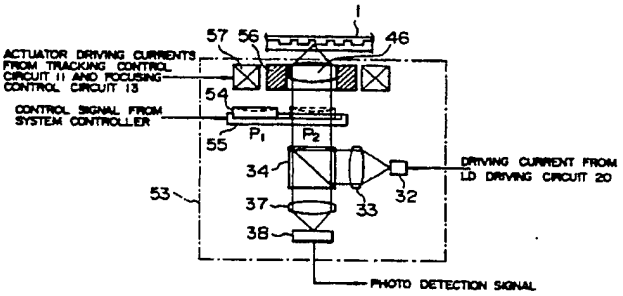
[57] ABSTRACT

An optical disc apparatus for recording, reproducing or erasing an information signal by converging a light flux onto a recording layer through a transparent substrate. The apparatus includes one or a plurality of optical heads having a plurality of objective lenses whose aberrations have respectively been corrected for a plurality of disc substrates of different thicknesses, a cartridge for enclosing the optical disc, a discrimination hole which is formed on the cartridge, and a sensor for detecting the opening/closing state of the discrimination hole and for generating a discrimination signal. In accordance with the result of the discrimination as to the thickness of the loaded optical disc, the objective lens, in which the occurrence of the aberration is smallest, is used, so that the information signal can preferably be recorded, reproduced or erased onto/from the optical discs having different substrate thicknesses. Instead of an optical head having objective lenses, an optical head having a waveguide and a plurality of converging grating couplers whose aberrations have respectively been corrected for a plurality of disc substrates of different thicknesses is provided to achieve the same object.

24 Claims, 18 Drawing Sheets




ACTUATOR DRIVING CURRENTS FROM TRACKING CONTROL CIRCUIT 11 AND FOCUSING CONTROL CIRCUIT 13
CONTROL SIGNAL FROM SYSTEM CONTROLLER
DRIVING CURRENT FROM LD DRIVING CIRCUIT 20
PHOTO DETECTION SIGNAL